Asthma—The Shift from Episodic Treatment to Ongoing Prevention, Education, and Management

ASTHMA IS A major public health problem in our society, affecting 14 to 15 million people in the United States. Morbidity is highest in children, blacks, and lower income and inner-city populations. Death rates are highest in older patients and blacks. Self-reported asthma prevalence and asthma death rates have increased, but the underlying reasons are uncertain.

Despite these trends, recent advances have improved our general understanding of asthma and our ability to manage it effectively. Asthma is now viewed as a chronic inflammatory disease requiring preventive management, as opposed to an episodic disease requiring intermittent acute treatment. To close gaps that exist between current science and actual practice in the community, the National Institutes of Health National Asthma Education and Prevention Program published *Guidelines for the Diagnosis and Management of Asthma.* These guidelines, updated in 1997, emphasize environmental controls, preventive medications, and ongoing education in the clinical management of asthma. A 52-page *Practical Guide* provides clinicians with suggestions and tools to use in their own practices.

Clinicians must work with patients and families to develop a workable plan to avoid and control precipitating factors. Patients should identify and avoid factors that worsen their disease, including allergens (such as dust mites, pets, and mold); irritants (such as tobacco and wood smoke); sulfites; and excessive exertion during high-pollution days. For example, using allergen-impermeable mattress and pillow covers and weekly hot water washing of sheets and blankets can decrease dust-mite allergen levels. Decreasing indoor humidity can also decrease both dust mites and indoor mold. Persons with persistent asthma should have skin or *in vitro* testing (e.g., radioallergosorbent (RAST) tests) for sensitivity to allergens to which they are perennially exposed. The test result should be used in the context of each patient's clinical history and may help motivate the patient to take appropriate control measures.

The guidelines explain how to grade severity of asthma, based on symptoms and objective measurements, into four categories: mild intermittent, mild persistent, moderate persistent, and severe persistent. Patients with any level of persistent asthma are advised to receive an annual influenza vaccine and use long-term preventive controller medications. These include inhaled steroids, cromolyn sodium, nedrocromil, long-acting beta$_2$-agonists, methylxanthines, and the new leukotriene modifiers. Inhaled steroids appear to be the most effective controller medications due to their potent anti-inflammatory actions. They are generally well tolerated and safe when used as recommended. To reduce the risk of potential side effects, patients using inhaled steroids should always use spacers and rinse their mouth after use. Other long-term control medications, such as the long-acting beta$_2$-agonists, can be added to achieve control while minimizing the inhaled steroid dosage. The exact role of leukotriene modifiers is still evolving. In infants and children with mild persistent asthma, cromolyn and nedocromil are often used initially due to their high safety profile. Although not first-line drugs, methylxanthines may be useful adjuncts for some patients, particularly for nocturnal symptoms, but require monitoring for potential toxicity.

Although proper inhaler technique and adherence to the medication schedule are important, it is estimated that only about half of patients adhere to their medication regimen and over half don't use their inhaler properly. Ongoing, consistent asthma education can potentially improve adherence and inhaler skills. Providing a full comprehensive educational session within the time span of a normal office visit is difficult; therefore, education should be incorporated into every encounter, including routine visits, urgent care visits, and when refilling prescriptions. Instructions should be repeated during regular follow-up visits, which are recommended every 1 to 6 months, depending on asthma severity and need for follow-up.

Treatment goals and plans should be made jointly by the patient, family, and physician and be tailored according to the patient's needs, lifestyle, and cultural beliefs. Patients should receive a *written* asthma action plan, explaining when they should adjust medications and seek medical help; this will facilitate early recognition and treatment of exacerbations and timely communication between the patient and clinician. Referrals to asthma classes and case management can be useful adjuncts. Overall, patients should be empowered with the tools to take control of their asthma in order to enjoy an active lifestyle.

Publications from the National Asthma Education and Prevention Program can be ordered through the National Heart, Lung and Blood Institute Information Center, P.O. Box 30105, Bethesda, MD 20824-0105 (Phone: 301-251-1222). Publications are also available on the Internet at http://www.nhlbi.nih.gov/nhlbi/lung/lung.htm.

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Influenza

Influenza has been responsible for pandemics and epidemics throughout history, with recorded cases dating as far back as 412 B.C. Abrupt onset of fever, myalgia, sore throat, nonproductive cough and severe malaise lasting several days are hallmarks of influenza infection.

Although mortality increases during influenza epidemics, it is generally due to bacterial pneumonia and complications of underlying cardiopulmonary and other chronic diseases. Those at highest risk for complications during influenza season include persons over 65; persons of any age with chronic pulmonary, cardiovascular, metabolic or renal disorders, hemoglobinopathy or immunosuppression; children and teens on long-term aspirin therapy; and pregnant women in the second or third trimester. In recent years there has been an increase in influenza-associated deaths in the United States, primarily occurring in those with immunosuppressive conditions such organ transplantation, HIV disease, and prematurity, as well as the growing population of persons aged 65 and older.

For influenza type A, at least 15 hemagglutinin (H) subtypes, and 9 neuraminidase (N) surface glycoprotein forms are known to exist among animals. Aquatic birds, particularly ducks, appear to be the primary host for influenza A viruses, since all subtypes can be found in them. From time to time, an avian strain crosses over to mammalian hosts, most commonly pigs and horses. Reassortment of human and avian influenza A genes in pigs results in novel viruses that may infect humans. Epidemiologists consider Central Asia to be the prime mixing ground and source of most recent pandemics. Until 1997 only two neuraminidase antigens (N1, N2) and three hemagglutinin antigens (H1, H2, H3) had been described in human infections. A novel strain of influenza A (H5, N1) was identified in Hong Kong in 1997 that was responsible for six deaths and tremendous concern among public health experts worldwide. No significant person-to-person spread occurred.

Each year the World Health Organization global program for influenza surveillance obtains and analyzes influenza strains for antigenic characteristics to assist in vaccine development for the coming season. Influenza vaccine is made from purified, egg-grown inactivated viruses and is composed of the three virus strains anticipated to be the predominant strains that will be in circulation, two of type A and one of type B. The decision of which strains to target is typically made in March, allowing vaccine manufacturers 6–7 months to produce vaccine supplies. A miscalculation could result in failure to include the predominant strain in the vaccine, leaving individuals unprotected; such was the case in the 1997–98 season, when the dominant influenza strain in North America was a new type A variant, A/Sydney/5/97 (H3N2). Recent work on live-virus vaccines grown in tissue culture and administered by intranasal spray has shown promise, but large-scale production is some time away.

In addition to targeting individuals at medical risk of complications, influenza vaccination is also strongly recommended in occupational settings. Care-givers of people at medical risk (i.e. hospital, outpatient, home care, nursing home, and chronic care employees) and members of households with high-risk individuals should be vaccinated. Persons who should *not* be vaccinated with inactivated influenza vaccine include those with known anaphylactic hypersensitivity to vaccine components such as eggs, and those with acute febrile illness.

Chemoprophylaxis or therapy with antiviral drugs is another option to supplement influenza vaccination. The antivirals currently available are effective only against type A influenza viruses and prevent illness, not infection. This allows an immune response to be mounted that may protect against reinfection with similar viruses. Antivirals (amantadine and rimantadine hydrochloride [rimantadine approved only for chemoprophylaxis in children, not therapy]) reduce the severity and duration of illness in adults if administered within 48 hours of illness onset. These drugs are not recommended for use after 48 hours of symptoms due to their lower efficacy. The dosage for both drugs is 5mg/kg/d up to 150 mg in 2 divided doses for children aged 1–9 yrs, and 100 mg bid for persons aged 10–65 years. For people over 65 years of age, the dose of amantadine is 100 mg/d or less while for rimantadine the dose can be from 100–200 mg/d. Treatment should be stopped within 24–48 hours after disappearance of symptoms. Though the two drugs are similar, 75% of rimantadine is metabolized by the liver, while 90% of amantadine is excreted unchanged. Both drugs and their metabolites are excreted by the kidneys. In healthy adults, a higher incidence of central nervous system side effects (anxiety, nervousness, lightheadedness, and difficulty concentrating) is reported with amantadine. Gastrointestinal side effects, such as nausea and anorexia, are infrequent for both drugs. However, among the elderly and persons with renal insufficiency, seizure disorders, or certain psychiatric conditions, use of amantadine may cause more serious side effects, such as delirium, seizures, agitation, hallucinations, and marked behavioral changes. Lowering the dosage usually reduces these side effects.

The Centers for Disease Control and Prevention (CDC) publishes periodic updates about influenza in the *Morbidity and Mortality Weekly Report*. State and local health departments disseminate information about local incidence, vaccine availability, and vaccination programs. Additional information can be obtained from the CDC through the Fax Information Service (888-232-3299), or World Wide Web at http://www.cdc.gov/ncidod/diseases/flu/fluvirus.htm

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